

Cryogenic Optical Metrology Through a Chamber Window, Phase I

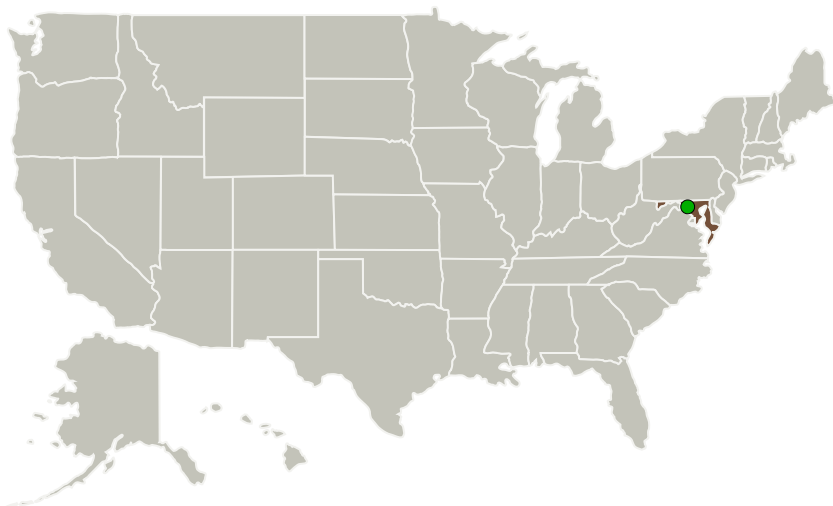
Completed Technology Project (2011 - 2011)



Project Introduction

In this Phase I SBIR project for NASA, Flexure Engineering of Greenbelt, MD will design and develop a system that marries the technologies of Thermal Vacuum Chambers and Non-Contact Metrology Systems providing NASA with sub-micron, three sigma uncertainties on Flight Hardware while at temperature (typically cryogenic, down to 30K) and in high vacuum ($>10E-6$ torr). This innovation provides NASA and the Aerospace Community increased capabilities for the alignment and performance verification of telescope optical surfaces and telescope optical assemblies. A key feature of the system is that the metrology system is housed outside of the harsh environment of the chamber, looking in through one or more windows and yet providing sub-micron uncertainties across large distances and of complex shapes. The cryo/vac system in Phase I and II will apply primarily to the integration and testing of optical space flight hardware while at the commercialization Phase III, the techniques will be generalized to include other settings such as optical, electronics and harsh environment manufacturing chambers and hermetically sealed fabrication and assembly systems.

Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
Flexure Engineering	Lead Organization	Industry	College Park, Maryland
● Goddard Space Flight Center(GSFC)	Supporting Organization	NASA Center	Greenbelt, Maryland

Primary U.S. Work Locations

Maryland

Project Transitions

**February 2011:** Project Start**September 2011:** Closed out

Closeout Documentation:

- Final Summary Chart(<https://techport.nasa.gov/file/138069>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Flexure Engineering

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

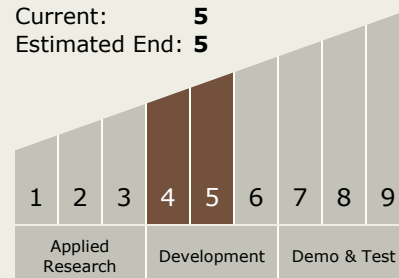
Carlos Torrez

Principal Investigator:

Gregory A Scharfstein

Technology Maturity (TRL)

Start: 4
Current: 5
Estimated End: 5



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Technology Areas

Primary:

- TX05 Communications, Navigation, and Orbital Debris Tracking and Characterization Systems
 - └ TX05.1 Optical Communications
 - └ TX05.1.6 Optimetrics

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System